rise to will be settled, I hope, by this Expedition before it returns to the sea. If at all near my line of march, its length, height, and local history will be ascertained. My young officers will like to climb to the summit, and I shall be glad to furnish them with every assistance."

At the time when this letter was written, Mr. Stanley was uncertain as to the destination of the streams flowing between "the two Muta Nzigés":—

"Many rivers will be found to issue from this curious land between the two Muta Nzigés. What rivers are they? Do they belong to the Nile or the Congo? There is no river going east or south-east from this section, except the Katonga and Kafur, and both must receive, if any, but a very small supply from Gordon Bennett and Ruwenzori. The new mountain must therefore be drained principally south and west. If south, the streams have connection with the Lake South; if west, the Semliki tributary of Lake Albert, and some river flowing to the Congo must receive the rest of its waters. Then, if the Lake South receives any considerable supply, the interest deepens. Does the lake discharge its surplus to the Nile or to the Congo? If to the former, then it will be of great interest to you, and you will have to admit that Lake Victoria is not the main source of the Nile; if to the Congo, then the lake will be the source of the River Lowwa or Coa, since it is the largest tributary to the Congo from the east between the Aruwimi and the Luama. For your comfort I will dare venture the opinion even now that the lake is the source of the Lowwa, though I know nothing positive of the matter. But I infer it, from the bold manner in which the Aruwimi trenches upon a domain that anyone would have imagined belonged to the Nile. It was only ten minutes' march between the head of one of its streams to the crest of the plateau whence we looked down upon the Albert Nyanza.

"From the mouth of the Aruwimi to the head of this stream is 390 geographical miles in a straight line. Well, next to the Aruwimi in size is the Lowwa River, and from the mouth of the Lowwa to the longitude of Ugampaka post in a direct line is only 240 geographical miles."

NOTES.

THE Gilbert Club, to which we referred last week, was formally founded on Thursday, November 28. The following officers were appointed at the first general meeting:—President, Sir William Thomson. Vice-Presidents: Lord Rayleigh, Prof. D. E. Hughes, Prof. Reinold, Mr. Jonathan Hutchinson (President of the Royal College of Surgeons), Dr. B. W. Richardson, and Mr. H. Laver, of Colchester. Mr. Latimer Clark was elected Treasurer, and Mr. Conrad Cooke, Prof. R. Meldola, and Prof. S. P. Thompson, Hon. Secretaries. The resolution finally adopted by the meeting was:—"That the objects of the Gilbert Club be as follows:—(1) To produce and issue an English translation of 'De Magnete' in the manner of the folio edition of 1600. (2) To arrange hereafter for the tercentenary celebration of the publication of 'De Magnete' in the year 1900. (3) To promote inquiries into the personal history, life, works, and writings of Dr. Gilbert. (4) To have power, after the completion of the English edition of 'De Magnete,' to undertake the reproduction of other early works on electricity and magnetism, provided at such date a majority of the members of the Club so desire." At the time of the inaugural meeting eighty-seven members had joined the Club.

PROF. J. BRYCE's speech (read by Prof. Holland) at the presentation of Mr. A. R. Wallace for the degree of D.C.L., *honoris causâ*, at Oxford, on November 26, was one of unusual interest. We may note especially the very masterly way in which the doctrine of the survival of the fittest was expressed. After describing Mr. Wallace's travels in Brazilian forests, and among the islands, "quæ ultra Chersonesum aureum soli nimium propinque subjacent," the speech referred to his discovery of the theory according to which new species are evolved, which was shortly stated as, "ea corpora vigere magis prolemque ex iis lætiorem surgere quæ ipsa nescio quo pacto natura vitæ periculis subeundis aptissima creaverit: sic stirpem a cæteris stirpibus dissimilem et in dies longius discrepantem propagari." The contemporaneous discovery of natural selection by Charles Darwin, and his cordial recognition of Mr. Wallace's merits, were mentioned: "tanta et in hoc et in illo inerat animi nobilitas veritatis quam gloriæ propriæ studiosior." Reference was made to Mr. Wallace's various writings.

WE regret to announce the sudden death of Dr. W. R. McNab. He died at his residence in Dublin on Tuesday morning, the 3rd inst. Dr. McNab was Professor of Botany in the Royal College of Science, Dublin, having succeeded Prof. Thiselton Dyer, F.R.S. He was also Scientific Superintendent and Referee to the Royal Botanic Gardens, Glasnevin, under the Science and Art Department. He appears to have been in his usual health on Monday, and on St. Andrew's Day (Saturday) took an energetic part in the meeting and banquet held by the Scotch residents in Dublin.

THE *Colonies and India* reports the death, in Melbourne, of Mr. Robert Brough Smyth, who was for sixteen years Secretary of Mines in Victoria. He was well known in Australia for his contributions, especially on geological questions, to scientific literature.

THE new Natural Science Museum of Berlin was opened on Monday. The Berlin Correspondent of the *Standard*, describing the proceedings, says that the ceremony was striking. A handsome tent, surmounted by an imperial crown, was erected for the Emperor and Empress, who were present with the Princess Frederick Charles, Prince Alexander, the Hereditary Prince and Princess of Meiningen, and a brilliant suite. Nearly all the Ministers, including Count Bismarck, who has just returned from Friedrichsruh, and the Minister of War, were in attendance. Count Waldersee, representatives of the Academy of Art, and the Professors of the University, were also present. Dr. von Gossler, Minister of Education, delivered an eloquent address, in which he mentioned that the collections were founded a hundred years ago, and expressed the hope that both science and the State would derive equal benefit from the new institution. Prof. Beyrich, the first Curator of the Museum, pledged himself to keep abreast with the progress of science. Their Majesties were conducted through the building by the keepers of the various collections.

THE Paris Museum of Natural History is about to elect a successor to M. Chevreul in the Chair of Chemistry.

AT the general monthly meeting of the Royal Institution, on December 2, the managers reported that they had re-appointed Prof. James Dewar, F.R.S., as Fullerian Professor of Chemistry.

THE Academy of Sciences of Vienna has appointed Prof. G. Niemann, of Vienna, and Major Steffan, of Cassel, to be present as impartial witnesses at the excavations at Hissarlik, begun, on November 25, under the direction of Dr. H. Schliemann and Dr. W. Dörpfeld. Captain Ernst Bötticher, who has often called in question the utility of Dr. Schliemann's archæological investigations, has been requested to take part in the excavations.

MR. HUGH G. BARCLAY, in his Report as to the fund for the preservation of birds in the Farne Islands, says he has every reason to believe that the birds were very well protected this season. He visited the islands twice, and each time he satisfied himself, by his own personal investigations, that the birds had not been unduly disturbed. Last year, at the request of the authorities, he allowed some young birds to be taken from the islands for the purpose of being placed on the lake at St. James's Park, London. The following is an extract from a letter he lately received from Mr. Rilly, the bird-keeper there:—"The only birds alive now of those brought from the Farne Islands are the cormorants, which are thriving. The puffins all died during the first three months. The guillemots lived somewhat longer, the death of the last one being the result of an accident. The one kittiwake also died by an accident. The terns died during the severe frost, being apparently unable to get about on the ice, their tail and wings collected the ice; I suppose on account of their being pinioned and not being able to use their wings freely."

The Council of the Dundee and District Association for the Promotion of Technical and Commercial Education has issued its first Annual Report, and is able to give a very good account of the results it has achieved. With regard to the future work of the Association, the Council suggests that workshop instruction for lads engaged at unskilled work in factories and during the day should be established in connection with the evening classes of the School Board. It also proposes the drafting of additional courses of instruction, especially in painting, decoration, and pattern designing, and the encouraging of higher classes in these subjects. In this connection the Council appropriately refers to the fact that in 1884 the Technical Instruction Commissioners reported that "the crowded schools of drawing, modelling, carving, and painting, maintained at the expense of the municipalities of Paris, Lyons, Brussels, and other cities—absolutely gratuitous and open to all comers, well lighted, furnished with the best models, and under the care of teachers full of enthusiasm—stimulate those manufactures and crafts in which the fine arts play an important part to a degree which is without parallel in this country."

A series of questions on the effects of London fogs on cultivated plants has been issued by the scientific committee of the Royal Horticultural Society. The experience of the current season only is to be utilized.

A specimen of the *Rorqual musculus* has just come ashore on the coast of the Médoc district. Dr. Beauregard, *aide-naturaliste* at the Paris Museum, went to the spot to examine this interesting cetacean. Unfortunately, the brain was already in a state of decomposition, but the breasts and ears were dissected off for complete examination. The animal was 14 metres long, and 6 metres in circumference at the thickest part of the body.

Prof. Chauveau has lately published in the *Archives de Pathologie Expérimentale* a contribution to the study of "transformism" in microbiology. His researches relate to *Bacillus anthracis*, and show that by experimental means various important biological alterations may be obtained.

Prof. Marshall Ward is about to deliver, at th eCity and Guilds of London Institute, a course of six lectures on timber, its nature, varieties, uses, and diseases. The lectures will be given on Monday and Thursday evenings, at 7.30 (December 12, 16, and 19, and January 23, 27, and 30). The object of the course is to explain as simply and clearly as possible, with the aid of numerous lantern illustrations, the nature, properties, varieties, and uses of the ordinary timbers used in construction, and to give an intelligible account of dry-rot, and allied diseases of timber.

The second series of lectures given by the Sunday Lecture Society will begin on Sunday afternoon, December 8, in St. George's Hall, Langham Place, at 4 p.m., when Mr. W. Lant Carpenter, B.Sc., will lecture on "The Wonders of the Yellowstone Park—a Personal Narrative," with oxy-hydrogen lantern illustrations from the lecturer's own camera. Lectures will also be given by Commander V. L. Cameron, R.N., Mr. J. F. Blake, Mr. Henry Blackburn, Mr. Wilmott Dixon, Mr. Stanton Coit, and Mr. Eric S. Bruce.

The annual general meeting of the Institution of Electrical Engineers will be held at the Institution of Civil Engineers, 25 Great George Street, Westminster, on Thursday, December 12, at 8 o'clock in the evening, for the reception of the annual report of the Council, and for the election of Council and Officers for the year 1890. The following paper will be further discussed: "Electric Engineering in America," by Mr. G. L. Addenbrooke.

It is stated that a scheme is on foot for establishing a Natural History Society in the Punjaub. It is to be hoped that it will be successful, and that the Society will flourish as other Indian scientific societies are doing.

In the introductory lecture to the agricultural class at the University of Edinburgh, delivered at the opening of the present session, Prof. Wallace chose as his subject some aspects of Australasian agriculture. In this lecture, which has now been printed, Prof. Wallace urges that sheep farmers in this country will shortly feel the effects of rivalry with the flock masters of Australia. There are 100,000,000 sheep in Australia, mostly merinos, which are not, by the way, a flesh-yielding but a wool-giving race. Prof. Wallace hazards the opinion, by a very easy process of arithmetic, that, before many years have passed, Australia will be possessed of over 200,000,000. He makes, also, the astonishing statement that merino mutton is equal in flavour and texture to our best Highland, Welsh, or South Down mutton. Upon these two assumptions, for they are nothing more, he foretells calamities to the meat producers of this country, which he, it is to be hoped, will not live to see.

A stalactite cave has been discovered in Ascheloh, near Halle, in Westphalia; it is reported to be more than 100 metres long.

A sharp shock of earthquake was felt at Oran, Algeria, on November 27, at 3 p.m. It lasted ten seconds, the oscillations being from east to west.

According to a telegram sent through Reuter's agency from Belgrade on December 2, violent shocks of earthquake, accompanied by loud subterranean rumblings, were felt on Sunday afternoon at Kregugewatz, Jagodina, and Kupsia. The disturbance generally travelled from east to west, but some of the shocks moved from north to south.

Mr. H. C. Russell, Government Astronomer of New South Wales, has published the results of meteorological observations made in that colony during 1887. The number of reporting stations is now 862, being 94 more than in 1886, the increase being almost wholly in rain stations. The arrangement of the tables, which give the most important data for each station separately, is the same as in previous years; but there are also two new tables giving the mean maximum and minimum temperature at Sydney for each month from 1856 to 1887. The mean temperature of the whole colony for the last seventeen years is 61°·2. At Sydney the mean for thirty years is 62°·7. The diagrams appended to the volume give a good idea of the weather conditions at Sydney, and clearly exhibit the peculiarities of certain periods, such as the very short winter of 1873, and the long one of 1874, also the long summer of 1877-78, with four months of hot weather, and the short summer of 1886-87, when there was only one month of hot weather. In 1878 the lowest winter temperature occurred in June, and in 1872 in August. A comparison is made of the rainfall at the principal places in the various colonies. The contrast between the amount at Brisbane and Sydney and that at Melbourne is very striking. At the former places as much rain sometimes falls in one month as would make a year's rainfall at Melbourne. At Sydney the least annual rainfall on record is 21·48 inches, and the greatest 82·81 inches. The question of evaporation continues to receive considerable attention; the tabular results are published, with the rain and river results, in a separate volume.

THE Meteorological Report of the Straits Settlements has been published for the year 1888, being the fifth year in which meteorological observations in the colony have been made the subject of a general systematic report. The temperature of the air ranged between 67°·2 and 96°, and solar radiation varied from 81° to 179°; the lowest temperature on the grass was 61°. Rainfall observations were received from forty-one stations. The annual amount differs considerably in the various provinces, the mean of the stations ranging from 65·6 inches in Singapore, to 111·7 inches in Penang, and 123·2 inches in Province Wellesley. The greatest fall in twenty-four hours, was 12 inches at Bertam, Province Wellesley, on October 21. The Report also contains a tabular statement of annual and monthly rainfall at Singapore since 1869, and diagrams of annual rainfall and other elements since 1870, at the same place.

THE International Commission for the scientific investigation of the Lake of Constance have nearly finished their task, which consisted of drawing a new and comprehensive map on a scale of 1 : 25,000; investigating the currents, density, temperatures, and chemical composition of the water; and minutely describing the flora and fauna of the lake. A full account will be issued when the researches are complete.

WE have received the latest instalment (pp. 321–84) of vol. xvi. of the Proceedings of the Royal Society of Edinburgh, session 1888–89. It contains:—The solubility of carbonate of lime in fresh and sea water, by W. S. Anderson, chemist at Marine Station, Granton (continued); secretion of carbonate of lime by animals, part ii., by Robert Irvine and Dr. G. Sims Woodhead; theoretical description of a new "azimuth diagram," by Captain Patrick Weir, communicated by Sir William Thomson; note on Captain Weir's paper, by Prof. Tait; on the coagulation of egg and serum albumen, vitellin, and serum globulin, by heat, by Dr. John Berry Haycraft and Dr. C. W. Duggan.

THE fourteenth part of Cassell's "New Popular Educator" has been published. It includes a clearly printed map of the world.

AT a recent meeting of the Bombay Anthropological Society, Mr. W. E. Sinclair, of the Civil Service, read a paper on flint remains in the Kolaba district. Referring to a collection belonging to the Society made in the Ghar Hills, near Sukker, on the Indus, Mr. Sinclair said that these hills were evidently a sort of "Black Country" to the flint-using races. Cones and flakes can be got there literally by the hundredweight. There is no historical evidence of the use of such things in India proper. On the contrary, all historical evidence points to the conclusion that India was one of the first countries to use iron, if not the very first. Amongst the wildest forest tribes to-day the use of stone does not go beyond weighting a fishing-line or bird arrow with a pebble; and although stone spindle-weights are still used on the coast, these are no more barbarous than the stones in an English mill. These cones of flint are covered with long grooves of a curved section; and the flakes show each one face corresponding to such a groove, which shows that they have been struck off such cones. The cones themselves have a peculiar typical form, and the art of producing flake or cone is one lost in the India of to-day. Where a flint shows that peculiar groove, there is good reason to assume that it was made before iron was known in India. On all the agates and chalcedonies in the Kolaba collection there are the same strange grooves, the same long blade-like flakes matching them, as in Sind or in England or France; and we are, in fact, in presence of a lost art, for which there has been no occasion from the time that iron came into common use. That was a long time ago in India. Steel—and very good steel, too—must have been for many generations in the hands of the ancient inhabitants of the Konkan when the first cave temples were hewn—at least 2000 years ago. On the other hand, the position of the flakes, both in Sind and in Kolaba, shows that they belong to a very recent geological period. The Kolaba specimens, except one or two, come from the surface of the lacustrine gravels abundant in the valleys of the Konkan. All search for them in places where sections of these gravels are exposed has hitherto been fruitless, and the few water-worn specimens found came out of a river bed. They most commonly occur at places where fresh water is to be had near an estuary.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♀) from India, presented by Colonel J. D. C. Ferrell; two Common Marmosets (*Hapale jacchus*) from South-East Brazil, presented by Mr. Charles Petrzywaski; an Arctic Fox (*Canis lagopus* ♀) from Siberia, presented by Mr. Stuart N. Corlett; a Corn Crake (*Crex pratensis*) from Essex, presented by Mr. Bibby; four Common Snakes (*Tropidonotus natrix*), British, presented by the London, Chatham, and Dover Railway; a European Bison (*Bison bonasus* ♂) from Central Europe, deposited; a Stanleyan Chevrotain (*Tragulus stanleyanus*) from Ceylon, a Prevost's Squirrel (*Sciurus prevosti* ♂) from Malacca, a Common Roe (*Capreolus capræa* ♂), European, a White-faced Tree Duck (*Dendrocygna viduata*) from Brazil, four Black-necked Swans (*Cygnus nigricollis*) from Antarctic America, a Curlew (*Numenius arquata*), British, two Indian Cobras (*Naia tripudians*) from India, an Annulated Snake (*Leptodira annulata*) from Panama, a Hawk's-billed Turtle (*Chelone imbricata*) from the East Indies, purchased; two Crested Pigeons (*Ocyphaps lophotes*) bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

OBJECTS FOR THE SPECTROSCOPE.

Sidereal Time at Greenwich at 10 p.m., December 5 = 2h. 59m. 33s.

Name.	Mag.	Colour.	R.A. 1890.	Decl. 1890.
			h. m. s.	° ′
(1) G. C. 648	—	—	3 12 31	+40 7
(2) D M. + 3° 410 ...	7	Yellowish-red.	2 51 19	+ 4 3
(3) γ Persei	3	White.	2 56 48	+53 4
(4) ι Cassiopeiæ	4	Bluish-white.	2 20 0	+66 54
(5) D.M. + 57° 702 ...	8	Red.	3 2 57	+57 29
(6) R Persei	Var.	Reddish.	3 23 3	+35 18
(7) T Geminorum ...	Var.	—	42 42	+24 0

Remarks.

(1) The General Catalogue description of this nebula is as follows:—Pretty bright, pretty small, round, brighter in the middle. The spectrum has not yet been recorded.

(2) This is a star of Group II., in which Dunér records the bands 2–8, and states that the bands 2 and 3 are especially well developed. This latter fact indicates that the star is well advanced, and it accordingly falls in a late species (13) of the group. As I have before pointed out with reference to similar stars, absorption *lines* of metallic substances, and possibly of hydrogen, may be expected at this stage, and it is important to note the presence or absence of these, as they will probably form a connecting link between the stars of this group and the slightly hotter stars of Group III. The intensity of the bright carbon fluting near *b*, as compared with its appearance in other stars of the group, will be an additional check in placing it in position on the "temperature curve."